

27-79

Journal of the International Association for Mathematical Geology

Volume 15, 1983

Editorial Board

Editor-in-Chief: T. A. Jones (USA)
Deputy Editor: C. J. Mann (USA)
Book Review Editor: D. M. Lorenz (USA)

Associate Editors:
W. E. Bardsley (New Zealand)
C. F. Chung (Canada)
I. Clark (UK)

Editorial Correspondents

M. Alfaro (Chile)
H. A. F. Chaves (Brazil)
A. C. Cook (Australia)
J. Crnicki (Yugoslavia)
A. G. Fabbri (Canada)
N. I. Fisher (Australia)
D. Gill (Israel)
I. Hattori (Japan)
D. M. Hawkins (South Africa)
W. R. James (USA)

Li Y. (China)
Liu Z. (China)
L. I. Malagrida (Spain)
F. N. Sadooni (Iraq)
A. K. Saha (India)
W. Scherer (Venezuela)
H. Siemes (West Germany)
J. E. J. H. van Landewijk (Ghana)
V. T. Vuchev (Bulgaria)

Officers and Council Members of the IAMG

President: E. H. T. Whitten (USA)
Past President: D. F. Merriam (USA)
Vice President: D. M. Hawkins (South Africa)
Secretary General: J. C. Davis (USA)
Treasurers: R. B. McCammon (USA)
V. T. Vuchev (Bulgaria)
Editors-in-Chief, Computers and Geosciences:
J. Cubitt (UK)
D. F. Merriam (USA)
Editor-in-Chief, Journal: T. A. Jones (USA)

Council Members:
R. J. Howarth (UK)
A. C. Cook (Australia)
I. Djafarov (USSR)
A. B. Vistelius (USSR)
F. N. Sadooni (Iraq)
N. Nishiwaki (Japan)

Journal of the International Association for Mathematical Geology is published bimonthly for the International Association for Mathematical Geology by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. In 1983, Volume 15 (6 issues) will be published. Subscription orders should be addressed to the publisher. *Journal of the International Association for Mathematical Geology* is abstracted or indexed in Applied Mechanics Reviews, Chemical Abstracts, Computer and Information Systems Abstracts Journal, Current Contents, Geocom Bulletin, Geotitles Weekly, Mathematical Reviews, Petroleum Abstracts, Referativnyi Zhurnal, Science Citation Index, and Zentralblatt für Mathematik. ©1983 Plenum Publishing Corporation. *Journal of the International Association for Mathematical Geology* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$3.00 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, Massachusetts 01970, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts. 0020-5958/83 \$3.00

Subscription rates:

Volume 15, 1983 (6 issues) \$160.00 (outside the U.S., \$179.00).
Volume 16, 1984 (8 issues) \$190.00 (outside the U.S., \$213.00).

Second-class postage paid at New York, N.Y., and at additional mailing offices.

Printed in the USA.

Journal of the International Association for Mathematical Geology is published bimonthly for the International Association for Mathematical Geology by Plenum Publishing Corporation, 233 Spring Street, New York, N.Y. 10013. In 1983, Volume 15 (6 issues) will be published. Subscription orders should be addressed to the publisher. *Journal of the International Association for Mathematical Geology* is abstracted or indexed in Applied Mechanics Reviews, Chemical Abstracts, Computer and Information Systems Abstracts Journal, Current Contents, Geocom Bulletin, Geotitles Weekly, Mathematical Reviews, Petroleum Abstracts, Referativnyi Zhurnal, Science Citation Index, and Zentralblatt für Mathematik. ©1983 Plenum Publishing Corporation. *Journal of the International Association for Mathematical Geology* participates in the Copyright Clearance Center (CCC) Transactional Reporting Service. The appearance of a code line at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use. However, this consent is given on the condition that the copier pay the flat fee of \$3.00 per copy per article (no additional per-page fees) directly to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, Massachusetts 01970, for all copying not explicitly permitted by Sections 107 or 108 of the U.S. Copyright Law. The CCC is a nonprofit clearinghouse for the payment of photocopying fees by libraries and other users registered with the CCC. Therefore, this consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale, nor to the reprinting of figures, tables, and text excerpts.

0020-5958/83 \$3.00

Journal of the International Association for Mathematical Geology

Volume 15, Number 1, February 1983

Contents

Introduction to the 10th Geochautauqua: Computer Applications in the Earth Sciences <i>F. P. Agterberg</i>	1
Computerized Vision for the Geologist <i>T. Kasvand</i>	3
Integration of Mineral Resource Data for the Kasmere Lake Area, Northwest Manitoba, with Emphasis on Uranium <i>G. F. Bonham-Carter and C. F. Chung</i>	25
SIMSAG: Integrated Computer System for Use in Evaluation of Mineral and Energy Resources <i>Chang-Jo F. Chung</i>	47
Characteristic Analysis—1981: Final Program and a Possible Discovery <i>Richard B. McCammon, Joseph M. Botbol, Richard Sinding-Larsen, and Roger W. Bowen</i>	59
Geological Similarity by Q Analysis <i>John C. Griffiths</i>	85
Calculation of Mass Transfer Among Minerals and Aqueous Solutions as a Function of Time and Surface Area in Geochemical Processes. I. Computational Approach <i>Harold C. Helgeson and William M. Murphy</i>	109
Geostatistics as a Tool to Define Various Categories of Resources <i>R. Sabourin</i>	131
A Procedure to Estimate the Parent Population of the Size of Oil and Gas Fields as Revealed by a Study of Economic Truncation <i>John H. Schuenemeyer and Lawrence J. Drew</i>	145
Probabilistic Formulation of a Method for the Evaluation of Petroleum Resources <i>P. J. Lee and P. C. C. Wang</i>	163

Automatic Recognition of Geologic Prospects <i>J. E. Robinson and Vijay Singh</i>	183
Detecting Nonrandom Associations Between Proportions by Tests of Remaining-Space Variables <i>Felix Chayes</i>	197
Second Order Approximation to the Variance of a Proportion <i>Antonio Possolo</i>	207
Oil Prospects of the Helez Formation, Southern Hashephela Region, Israel: Evaluation of the Thoroughness of Search Achieved by Past Exploration <i>D. Gill and R. Gabai</i>	211
ABSTRACTS	217

Journal of the International Association for Mathematical Geology

Volume 15, Number 2, April 1983

CONTENTS

Introduction to the Special Issue on Geostatistics, Geomathematics, and Computer Applications <i>Richard B. McCammon</i>	235
Twenty-five Years of Mathematical Geology: A New Threshold <i>E. H. Timothy Whitten</i>	237
Two Methods with Different Objectives: Splines and Kriging <i>Olivier Dubrule</i>	245
The Multigaussian Approach and its Applications to the Estimation of Local Reserves <i>G. Verly</i>	259
Estimation Using Spatially Distributed Multivariate Data: An Example with Coal Quality <i>Bruce M. Davis and Kent A. Greenes</i>	287
Definition of a Correlation Coefficient Between Data Points <i>J. L. Mallet</i>	301
A Statistical Method to Evaluate Homogeneity of Structural Populations <i>Stanley M. Miller</i>	317
Statistical Analysis of Rock Mass Fracturing <i>Gregory B. Baecher</i>	329
Conditional Analysis for Petroleum Resource Evaluations <i>P. J. Lee and P. C. C. Wang</i>	349
The Eastern Gas Shales Project (EGSP) Data System: A Case Study in Data Base Design, Development, and Application <i>T. S. Dyman and L. A. Wilcox</i>	363
A Computer-Based System for Processing Geophysical Data Obtained from Boreholes <i>J. M. Richter</i>	371
Opportunities for the 80s <i>Robert G. Garrett</i>	385
Abstracts	399

Journal of the International Association for Mathematical Geology

Volume 15, Number 3, June 1983

Contents

Multivariate Models for Landslide Hazard Evaluation <i>Alberto Carrara</i>	403
Test of Independence by Repeated Matching of Stratigraphic Sections <i>Jan Vrbik</i>	427
Nonparametric Estimation of Spatial Distributions <i>A. G. Journel</i>	445
Random Error in Point Counting <i>W. E. Bardsley</i>	469
The Combination of Subjective Information and Drillhole Data for Estimating the Size of an Elliptical Target <i>Henning Omre</i>	477
Development of Mathematical Geology in China <i>Liu Chengzuo and Li Yuwei</i>	483

LETTERS TO THE EDITOR

The Interpretation of the Isotopic Ratio $^{235}\text{U}/^{238}\text{U}$ in Fission Track Dating <i>G. M. Laslett, A. J. W. Gleadow, and I. R. Duddy</i>	493
The Interpretation of the Isotopic Ratio $^{235}\text{U}/^{238}\text{U}$ in Fission Track Dating: Comment <i>V. E. McGee and N. M. Johnson</i>	497
Simulating an Auto-Correlated Sequence of Rayleigh Variables <i>N. I. Fisher</i>	499
Correspondence Analysis in Geochemistry <i>A. T. Miesch</i>	501
Correspondence Analysis in Geochemistry: Reply <i>Françoise Valençon</i>	505

REVIEWS	511
---------	-----

ANNOUNCEMENT	515
--------------	-----

Journal of the International Association for Mathematical Geology

Volume 15, Number 4, August 1983

Contents

Regression Revisited <i>Isobel Clark</i>	517
Kriging of Water Levels in the Souss Aquifer, Morocco <i>Mohamed Aboufirassi and Miguel A. Mariño</i>	537
A Simple Sufficient Condition for a Variogram Model to Yield Positive Variances Under Restrictions <i>Mark R. Dunn</i>	553
BOOK REVIEW	565
LETTERS TO THE EDITOR	567
ERRATUM	579

Journal of the International Association for Mathematical Geology

Volume 15, Number 5, October 1983

Contents

Dual Extraction of <i>R</i> -Mode and <i>Q</i> -Mode Factor Solutions <i>Di Zhou, Theodore Chang, and John C. Davis</i>	581
Invariant Point Configurations—A Combinatorial Approach <i>Steven I. Usdansky and Dennis E. White</i>	607
Shape and Texture from Serial Contours <i>C. Lin</i>	617
Estimation of Linear Combinations and Co-Kriging <i>Donald E. Myers</i>	633
SHORT NOTE	
A Semiquantitative Explanation of the Observed Ventisphere Phenomenon <i>Emanuel Azmon and David Elazar</i>	639
REVIEW	643
LETTER TO THE EDITOR	645

Journal of the International Association for Mathematical Geology

Volume 15, Number 6, December 1983

Contents

Confidence Limits for Fission-Track Dating <i>W. E. Bardsley</i>	649
Eigenshape Analysis of Microfossils: A General Morphometric Procedure for Describing Changes in Shape <i>G. P. Lohmann</i>	659
Application of Time Series Analysis to the Tectonic Analysis of Disturbed Rock Sequences Recorded from Drill Hole Logs with Exam- ples from the Paleozoic of Graz (Austria) <i>K. Stattegger</i>	673
Cross Validation of Kriging in a Unique Neighborhood <i>Olivier Dubrule</i>	687
A Mathematical Study of <i>Cyrtograptus sakmaricus</i> Lineage <i>Huo Shicheng and Shu Degan</i>	701
ASSOCIATION ANNOUNCEMENT	
Seventh William Christian Krumbein Medalist: Daniel Gerhardus Krige <i>E. H. Timothy Whitten</i>	709
AUTHOR INDEX TO VOLUME 15	713
SUBJECT INDEX TO VOLUME 15	715
